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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO. FILING DATE FIRST NAMED INVENTOR ATTORNEY DOCKET NO.
10/736,087 12/15/2003 Joseph C. Walsh 2003P88074US

Response To OFFICIAL ACTION

EXAMINER
Jones, Dameron Levest

ART UNIT | PAGE NUMBER

1618 2

AMENDMENTS TO THE CLAIMS

In the Claims, please make the following amendments:

1. (Withdrawn) A method of preparing an ¹⁸F-FLT precursor having the following formula:

wherein X is t-butoxycarbonyl, methyl, methoxymethyl ethyl, isobutyl, tetrahydropyranyl ether, tetrahydrafuranyl ether, methoxymethyl ether, bis-(2-chloroethoxy)methyl ether, 1-ethoxyethyl ether, or 1-methyl-1-methoxyethyl ether; P is an amine protecting group; and L is a leaving group, comprising the steps of:

a. reacting a compound having the following formula:

with a reagent that opens the 2,3'-anhydro ring to produce 3'-beta-hydroxy thymidine;

b. protecting the 5'hydroxyl group to produce a compound having the following formula:

wherein X is the same as defined above;

c. incorporating a leaving group at the 3'-position to produce a compound having the following formula:

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNE	Y DOCKET NO.	
10/736,087	12/15/2003	Joseph C. Walsh	2003	P88074US	
			EX	AMINER	
Respo	onse To OFFICIAL ACTION		Jones, Dameron Levest		
			ART UNIT	PAGE NUMBER	

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wherein X and L are the same as defined above; and

- d. protecting the 3-N amine moiety to produce the precursor.
- 2. (Withdrawn) The method according to Claim 1, wherein the amine protecting group is selected from the group consisting of tert-butoxycarbamate, isopropyl carbarnate, pivaloyloxymethyl carbamate, methyl carbamate, allyl carbamate, N-tetrahydropyran, N-tetrahydrofuran; t-butylamide, and N-pyrrolidinomethylamide.
- 3. (Withdrawn) The method according to Claim 1, wherein the amine protecting group is t-butoxycarbonyl.
- 4. (Withdrawn) The method according to Claim 1, wherein X is t-butoxycarbonyl, methyl, methoxymethyl ethyl, or isobutyl.
- 5. (Withdrawn) The method according to Claim 1, wherein X is t-butoxycarbonyl.
- 6. (Withdrawn) The method according to Claim 1, wherein L is selected from the group consisting of benzenesulfonyl, methylsulfonyl, p-methylbenzenesulfonyl, 4-nitrobenzene sulfonyl, p-bromobenzenesulfonyl, trifluoromethylsulfonyl, trichloroacetimidate, 2,2,2-trifluoroethanesulfonyl, and imidazolesulfonyl.
- (Withdrawn) The method according to Claim 1, wherein L is nosylate.
- 8. (Withdrawn) The method according to Claim 1, wherein the precursor is 5'-O-Boc-3'- β -nosyl-3- Λ -Boc thymidine.
- 9. (Withdrawn) The method according to Claim 1, wherein the 2,3'-anhydro ring is opened by reacting 2,3'-anhydrothymidine with NaOH, KOH, LiOH, or tetrabutylammonium hydroxide.
- 10. (Withdrawn) A method of preparing an ¹⁸F-FLT precursor having the following formula:

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.		
10/736,087	12/15/2003	Joseph C. Walsh	2003P88074US		
Respo	onse To OFFICIA	To OFFICIAL ACTION		EXAMINER Jones, Dameron Levest	
•			ART UNIT PAGE NUMBER		
		'	1618	4	

wherein P is an amine protecting group and L is a leaving group, comprising the steps of:

a. reacting a compound having the following formula:

with a reagent that opens the 2,3'-anhydro ring to produce 3'-beta-hydroxy thymidine;

b. reacting the reaction product of step (a) with BOC₂O to produce a compound having the following formula:

c. incorporating a leaving group at the 3'-position to produce a compound having the following formula:

wherein L is the same as defined above; and

d. protecting the 3-N amine moiety to produce the precursor.

11. (Withdrawn) The method according to Claim 10, wherein the amine protecting group is selected from the group consisting of tert-butoxycarbamate, isopropyl

Г	APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	
-	10/738,087	12/15/2003	Joseph C. Walsh	2003P88074US	
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Response To OFFICIAL ACTION			Jones, D	ameron Levest	
	•			ART UNIT PAGE NUMBE	
			•	1619	5

carbamate, pivaloyloxymethyl carbamate, methyl carbamate, allyl carbamate, *N*-tetrahydropyran, *N*-tetrahydrofuran; t-butylamide, and *N*-pyrrolidinomethylamide.

- 12. (Withdrawn) The method according to Claim 10, wherein the amine protecting group is t-butoxycarbonyl.
- 13. (Withdrawn) The method according to Claim 10, wherein L is selected from the group consisting of benzenesulfonyl, methylsulfonyl, p-methylbenzenesulfonyl, 4-nitrobenzene sulfonyl, p-bromobenzenesulfonyl, trifluoromethylsulfonyl, trichloroacetimidate, 2,2,2-trifluoroethanesulfonyl, and imidazolesulfonyl.
- 14. (Withdrawn) The method according to Claim 10, wherein L is nosylate.
- 15. (Withdrawn) The method according to Claim 10, wherein the precursor is 5'-Ο-Boc-3'-β-nosyl-2-N-Boc thymidine.
- 16. (Withdrawn) The method according to Claim 10, wherein the 2,3'-anhydro ring is opened by reacting 2,3'-anhydrothymidine with NaOH, KOH, LiOH, alkylammonium hydroxides such as tetrabutylammonium hydroxide.
- 17. (Withdrawn) A method for preparing an ¹⁸F-FLT precursor comprising:
 - a. converting thymidine into 2,3'-anhydrothymidine;
 - b. opening the 2,3'-anhydro ring to produce 3'-beta-hydroxy thymidine;
 - c. protecting the 5'-hydroxy with t-butoxycarbonyl;
 - d. incorporating a leaving group at the 3'-position; and
 - e. protecting the 3-N amine to produce the precursor.
- 18. (Withdrawn) A method according to Claim 17, wherein the 2,3'-anhydro ring is opened by reacting 2,3'-anhydrothymidine with NaOH, KOH, LiOH, or tetrabutylammonium hydroxide.
- 19. (Withdrawn) A method according to Claim 17, wherein the 5'-hydroxy is protected by reacting the reaction product of step (b) with BOC₂O.
- 20. (Withdrawn) A method according to Claim 17, wherein the leaving group is a sulfonate ester.

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNE	Y DOCKET NO.
10/736,087	12/15/2003	Joseph C. Walsh	2003P88074US EXAMINER Jones, Dameron Levest	
Dans	ones To OFFICIA	1 ACTION		
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			1618	6

- 21. (Withdrawn) A method according to Claim 17, wherein L is selected from the group consisting of benzenesulfonyl, methylsulfonyl, p-methylbenzenesulfonyl, 4-nitrobenzene sulfonyl, p-bromobenzenesulfonyl, trifluoromethylsulfonyl, trichloroacetimidate, 2,2,2-trifluoroethanesulfonyl, and imidazolesulfonyl.
- 22. (Withdrawn) A method according to Claim 17, wherein L is nosylate, tosylate, or mesylate.
- 23. (Withdrawn) A method according to Claim 17, wherein the amine protecting group is selected from the group consisting of tert-butoxycarbamate, isopropyl carbamate, pivaloyloxymethyl carbamate, methyl carbamate, allyl carbamate, *N*-tetrahydropyran, *N*-tetrahydrofuran; t-butylamide, and *N*-pyrrolidinomethylamide.
- 24. (Withdrawn) A method according to Claim 17, wherein the amine protecting group is t-butoxycarbonyl.
- 25. (Withdrawn) A compound having the following formula:

wherein X is t-butoxycarbonyl, methyl, methoxymethyl ethyl, isobutyl, tetrahydropyranyl ether, tetrahydrafuranyl ether, methoxymethyl ether, bis-(2-chloroethoxy)methyl ether, 1-ethoxyethyl ether, or 1-methyl-1-methoxyethyl ether; P is an amine protecting group; and L is a leaving group.

- 26. (Withdrawn) A compound according to Claim 25, wherein P is selected from the group consisting of tert-butoxycarbamate, isopropyl carbamate, pivaloyloxymethyl carbamate, methyl carbamate, allyl carbamate, *N*-tetrahydropyran, *N*-tetrahydrofuran; t-butylamide, and *N*-pyrrolidinomethylamide.
- 27. (Withdrawn) A compound according to Claim 25, wherein P is t-butoxycarbonyl.
- 28. (Withdrawn) A compound according to Claim 25, wherein L is a sulfonate ester.

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	
10/736,087	12/15/2003	Joseph C. Walsh	2003P88074US	
			EXA	AMINER
Respo	nse To OFFICIA	L ACTION	Jones, Dameron Levest	
			ART UNIT .	PAGE NUMBER
		'	1618	7

- 29. (Withdrawn) A compound according to Claim 25, wherein L is selected from the group consisting of benzenesulfonyl, methylsulfonyl, p-methylbenzenesulfonyl, 4-nitrobenzene sulfonyl, p-bromobenzenesulfonyl, trifluoromethylsulfonyl, trichloroacetimidate, 2,2,2-trifluoroethanesulfonyl, and imidazolesulfonyl.
- 30. (Withdrawn) A compound according to Claim 25, wherein L is nosylate, tosylate, or mesylate
- 31. (Withdrawn) A compound according to Claim 25, wherein X is t-butoxycarbonyl, methyl, methoxymethyl ethyl, or isobutyl.
- 32. (Withdrawn) A compound having the following formula:

wherein P is an amine protecting group and L is a leaving group.

- 33. (Withdrawn) A compound according to Claim 32, wherein P is selected from the group consisting of tert-butoxycarbamate, isopropyl carbarnate, pivaloyloxymethyl carbamate, methyl carbamate, allyl carbamate, *N*-tetrahydropyran, *N*-tetrahydrofuran; t-butylamide, and *N*-pyrrolidinomethylamide.
- 34. (Withdrawn) A compound according to Claim 32, wherein P is t-butoxycarbonyl.
- 35. (Withdrawn) A compound according to Claim 32, wherein L is a sulfonate ester.
- 36. (Withdrawn) A compound according to Claim 32, wherein L is selected from the group consisting of benzenesulfonyl, methylsulfonyl, p-methylbenzenesulfonyl, 4-nitrobenzene sulfonyl, p-bromobenzenesulfonyl, trifluoromethylsulfonyl, trichloroacetimidate, 2,2,2-trifluoroethanesulfonyl, and imidazolesulfonyl.
- 37. (Withdrawn) A compound according to Claim 32, wherein L is nosylate, tosylate, or mesylate.
- 38. (Withdrawn) A compound having the following formula:

1618

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	
10/736,087	12/15/2003	Joseph C. Walsh	2003P88074US	
			EX	AMINER
Respo	onse To OFFICI A	L ACTION	Jones, Dameron Levest	
•			ART UNIT	PAGE NUMBER

39. (Currently amended) A method for preparing a compound having the following formula:

comprising:

a. [18F]fluorinating a compound having the following formula:

wherein P is an amine protecting group and L is a leaving group, to produce a compound having the formula:

compound having the following femula:

wherein P is the same as defined above; and

b. removing the amine protecting group and Boc group to produce ¹⁸F-FLT.

40. (Previously presented) A method according to Claim 39, wherein P is selected from the group consisting of tert-butoxycarbamate, isopropyl carbamate,

_			EXAMINER Jones, Dameron Levest ART UNIT PAGE NUMBE	
Respo	onse To OFFICIA	L ACTION		
			7	

pivaloyloxymethyl, carbamate, methyl carbamate, allyl carbamate, N-tetrahydropyran, N-tetrahydrofuran; t-butylamide, and N-pyrrolidinomethylamide.

- 41. (Previously presented) A method according to Claim 39, wherein P is t-butoxycarbonyl.
- 42. (Previously presented) A method according to Claim 39, wherein L is benzenesulfonyl, methylsulfonyl, p-methylbenzenesulfonyl, 4-nitrobenzene sulfonyl, p-bromobenzenesulfonyl, trifluoromethylsulfonyl, trichloroacetimidate, 2,2,2-trifluoroethanesulfonyl, or imidazolesulfonyl.
- 43. (Previously presented) A method according to Claim 39, wherein L is nosylate, tosylate, or mesylate.
- 44. (Previously presented) A method according to Claim 39, wherein P is t-butoxycarbonyl and L is nosylate.
- 45. (Previously presented) A method according to Claim 39, wherein the amine protecting group and boc groups are removed by acid hydrolysis.
- 46. (Previously presented) A method according to Claim 39, wherein the amine protecting group and boc group are removed by treating the reaction product of step (a) with HCI, HBr, HOAc, H₂SO₄, HI, trimethylsilyliodide, or H₃PO₄.
- 47. (Withdrawn) A method for preparing a precursor for the preparation of a radiolabeled nucleoside comprising:
 - a. converting a 2'-deoxy nucleoside into a 2,3'-anhydronucleoside;
 - b. opening the 2,3'-anhydro ring to produce 3'-beta-hydroxy nucleoside;
 - c. protecting the 5'-hydroxy with t-butoxycarbonyl;
 - d. incorporating a leaving group at the 3'-position; and
- e. protecting the 3-N amine to produce the radiolabeled nucleoside precursor.
- 48. (Withdrawn) The method according to Claim 47, wherein the nucleoside is thymidine, cytidine, or uridine.

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.		
10/736,087	12/15/2003	Joseph C. Walsh	2003	P88074US	
			EXAMINER		
Respo	onse To OFFICIA	L ACTION	Jones, Dameron Levest ART UNIT PAGE NUMBE		
			1619	10	

- 49. (Withdrawn) The method according to Claim 47, wherein the leaving group is nosylate, tosylate, or mesylate.
- 50. (Withdrawn) The method according to Claim 47, wherein the amine protecting group is t-butoxycarbonyl.

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